



U.S. Department of Energy
Office of River Protection

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01-OSR-0501

Mr. Ron F. Naventi, Project Manager
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Dear Mr. Naventi:

CONTRACT NO. DE-AC-01RV14136 – ALARA PROGRAM ASSESSMENT INSPECTION
REPORT, IR-01-011

From November 26 through 30, 2001, the Office of Safety Regulation (OSR) performed an inspection of the Bechtel National, Inc. (BNI) ALARA Program including its implementation. The purpose of this letter is to forward the results of the inspection. No Findings were identified as a result of this inspection.

This inspection focused on review of BNI's ALARA Design Program and implementation. At the time of this inspection, little of the design directly impacting occupational radiation protection had been finalized. For the design that had been completed or was in process, the OSR found the ALARA programs and procedures in place and being implemented. However, the OSR identified a weakness in BNI's process to establish and maintain records of actions considered or taken to implement ALARA design criterion. During preliminary design (alpha revisions of drawings), few ALARA design review records were being issued to capture the ALARA considerations that were being incorporated into the design of the facilities. Although these types of records were not required to be developed until final design, failure to formally document ALARA criteria as they are being considered could result in loss of valuable information, possibly resulting in unnecessary rework at a later date.

If you have any questions regarding this inspection, please contact me or Pat Carrier of my staff, (509) 376-3574. Nothing in this letter should be construed as changing the Contract, DE-AC27-01-RV14136. If in my capacity as the Safety Regulation Official, I provide any direction that your company believes exceeds my authority or constitutes a change to the Contract, you will immediately notify the Contracting Officer and request clarification prior to complying with the direction.

Sincerely,

Robert C. Barr
Safety Regulation Official
Office of Safety Regulation

OSR:JLP

Enclosure

U. S. DEPARTMENT OF ENERGY
Office of River Protection
Office of Safety Regulation

INSPECTION: ALARA PROGRAM INSPECTION

REPORT NO. IR-01-011

FACILITY: Bechtel National, Inc. (BNI)

LOCATION: 3000 George Washington Way
Richland, Washington 99352

DATES: November 26-30, 2001

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EXECUTIVE SUMMARY
As Low As Reasonably Achievable (ALARA) Program Inspection
Inspection Report Number IR-01-011

INTRODUCTION

The scope of this inspection of the Bechtel National, Inc. (the Contractor) focused on the ALARA Program during design of the Waste Treatment Plant (WTP) and covered the following specific areas:

- ALARA Program Documentation (Section 1.2)
- ALARA Program Implementing Procedures (Section 1.3)
- ALARA Design (Section 1.4)
- Consideration of Non-Radiological Hazards (Section 1.5)
- ALARA Records (Section 1.6)

SIGNIFICANT OBSERVATIONS AND CONCLUSIONS

- The Contractor had developed a program that addressed the seven essential elements of ALARA as committed to in its Radiation Protection Program for Design and Construction. Proper implementation of this program should ensure compliance with the requirements expressed in 10 CFR 835, *Occupational Radiation Protection*, Subpart K, "Design and Control." (Section 1.2)
- Procedures and guides established and maintained to implement the Contractor's ALARA program were adequate. However, the Contractor's plan to document ALARA actions when the design is finalized may result in lost information and the unnecessary need for rework to recreate the ALARA actions taken during preliminary design. (Section 1.3)
- Although little of the design directly impacting occupational radiation protection had been finalized, there was consistent evidence that ALARA had been considered and actions had been taken to ensure the design objectives for controlling future occupational exposure was being achieved. (Section 1.4)
- The Contractor had established design processes that considered non-radiological hazards during implementation of the ALARA design program. Implementation of these processes should ensure industrial, physical, and chemical hazards and the risk of personnel injury from non-radiological hazards will not be disproportionately increased as a result of radiological ALARA applications. (Section 1.5)
- As stated above (Section 1.3), the Contractor did not require formal ALARA design documentation until the applicable design is finalized. Therefore, little formal ALARA documentation was available at this stage of design. The formal ALARA documentation reviewed was adequate. Also, there was documented evidence that ALARA concepts

were being incorporated into the preliminary design. However, there was no clear procedural requirement that this documentation would be maintained and available at the time the applicable design is finalized. (Section 1.6)

ALARA PROGRAM INSPECTION, IR-01-011

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ALARA PROGRAM INSPECTION REPORT, IR-01-011

1.0 REPORT DETAILS

1.1 Introduction

In accordance with the U.S. Department of Energy (DOE), Office of River Protection (ORP), River Protection Project Waste Treatment Plant (RPP-WTP) Contract¹ and, specifically, 10 CFR 835, *Occupational Radiation Protection*, Subpart K, "Design and Control," Bechtel National, Inc. (the Contractor) is required to take measures to maintain radiation exposure in controlled areas as low as is reasonably achievable (ALARA) through facility and equipment design and administrative control. 10 CFR 835, Subpart B, that required Radiation Protection Programs (RPPs), required that the Contractor's RPP include formal plans and measures for applying the ALARA process. These requirements were reflected in the Contractor's authorization basis (e.g., the BNFL-TWP-SER-003, Radiation Protection Program for Design and Construction, Revision 8, and Safety Requirements Document [SRD], BNFL-5193-SRD-01, Volume 1, Revision 2, and Volume 2, Revision 4).

The scope of this inspection focused on the ALARA Program during design of the RPP-WTP and covered the following specific areas:

- ALARA Program Documentation (Section 1.2)
- ALARA Program Implementing Procedures (Section 1.3)
- ALARA Design (Section 1.4)
- Consideration of Non-Radiological Hazards (Section 1.5)
- ALARA Records (Section 1.6)

The inspectors reviewed the Contractor's program and procedures to determine if they complied with the commitments in the RPP and other authorization basis documents. In addition, the inspectors assessed the implementation of the Contractor's ALARA program and procedures as they related to the design phase of the RPP-WTP Contract to verify the Contractor was following its procedures and properly conducting important-to-safety (ITS) activities.

The last ALARA inspection of the RPP-WTP project took place on July 12, 1999 (IR-99-004, letter 99-RU-0464). The results of that inspection were one Finding and one weakness that were subsequently closed by the Contractor and the Office of Safety Regulation (OSR).

¹ Contract No. DE-AC27-01RV14136 between the U.S. Department of Energy and Bechtel National Inc., December 11, 2000.

1.2 ALARA Program Documentation (ITP I-111)

1.2.1 Inspection Scope

The inspectors reviewed the formal plans and measures for applying ALARA during the design process to assure the regulatory requirements and the authorization basis commitments were met and changes made since the last inspection did not reduce the effectiveness of the RPP.

1.2.2 Observations and Assessments

The Contractor's ALARA program consisted of the top-level requirements specified in their RPP for Design and Construction as described in PL-W375-NS00005, *RPP-WTP ALARA Program*, and 24590-WTP-MN-ESH-01-001, *Waste Treatment Plant Radiological Control Manual* (WTPRCM).

RPP Requirement 13 stated in part, "This requirement is implemented through PL-W375-NS00005, *RPP-WTP ALARA Program*." On September 27, 2001, the Contractor replaced PL-W375-NS00005 with 24590-WTP-PL-01-002, *RPP-WTP Occupational ALARA Program*. As stated in RPP Requirement 18, "Changes, additions, or updates to the RPP may become effective without prior Department approval only if the changes do not decrease the effectiveness of the RPP and the RPP change must be submitted to DOE." Review of *RPP-WTP Occupational ALARA Program* identified five changes warranting a determination of impact on the effectiveness of the RPP and submittal of an update to DOE. As evidenced by the *Document Review Request*, for 24590-WTP-PL-01-002, of September 26, 2001, the Contractor conducted an evaluation of the changes in accordance with its WTP document control system and prepared an update to the RPP that had not been received by the Office of Safety Regulation (OSR) as of November 30, 2001. The inspectors reviewed the changes and discussed them with the Radiological and Fire Safety Manager and determined the Contractor's conclusion of no decrease in effectiveness of the RPP was appropriate.

The *RPP-WTP Occupational ALARA Program* addressed the seven topics specified in RPP Requirement 13; however, it did not specifically mention how the design of the facility and the selection of materials would include features that facilitate ALARA during decommissioning. Safety Criterion 8.0-2 of the SRD Volume II stated in part that, "Facilities shall be designed to simplify decontamination and decommissioning, reducing exposure to site personnel and the public during these activities, and increase the potential for reuse." The inspectors noted the *RPP-WTP Occupational ALARA Program* indicated the ALARA design process would be described and implemented by 24590-WTP-GPP-SRAD-002A, *Application of ALARA in the Design Process*, September 28, 2001, and 24590-WTP-GPG-SRAD-001, *Design Guide for ALARA*, September 28, 2001. The inspectors identified no deficiencies with the ALARA Program documentation.

RPP Requirement 106 identified the *RPP-WTP Occupational ALARA Program* document as an Implementing Plan and Measure commitment. This program document specified the use of an ALARA Subcommittee (ASC) that consisted of a multi-disciplined forum that reviewed and advised management on improving progress towards minimizing dose and radiological releases.

The inspectors found the ASC consisted of a multi-disciplined forum. The Contractor had appropriate procedures for operation of the ASC. The inspectors observed an ASC meeting and noted it followed the procedure process for conduct of the meeting. During the ASC meeting, the ASC reviewed two management self-assessments and received a presentation on the status of High Level Waste (HLW) shielding and classification areas. All of the ASC members participated in the discussions of these design items. The inspectors identified no deficiencies.

1.2.3 Conclusions

The Contractor had developed a program that addressed the seven essential elements of ALARA as committed to in its RPP for Design and Construction. Proper implementation of this program should ensure compliance with the requirements expressed in 10 CFR 835, Subpart K, "Design and Control."

1.3 ALARA Program Implementing Procedures (ITP I-111)

1.3.1 Inspection Scope

The inspectors reviewed the ALARA program implementing procedure and guide to determine the technical adequacy of the ALARA design process. ALARA records for the period ranging from March 2001 to November 19, 2001, selected from the document control database, along with other documents presented by Contractor representatives were used to assess the effectiveness of implementation. Interviews were held with design engineers and management and radiological safety engineers and management to verify: (1) they had the requisite training and experience to execute their ALARA design responsibilities, and (2) the ALARA procedures and guides were being implemented.

1.3.2 Observations and Assessments

The inspectors reviewed *Application of ALARA in the Design Process* and *Design Guide for ALARA*. The inspectors found these documents provided sufficient direction to implement an adequate ALARA design process. The Document Checking and Approval Sheets (Form K70F007) indicated documents were to be prepared and controlled in accordance with the Contractor's quality procedures.

Several design engineers, radiological safety engineers, and their supervisors were contacted to observe implementation of the ALARA procedures and guides. Without exception, based on viewing of the design engineers' Employee Training Profiles and discussions with them regarding their education and experience, all had the education and skills necessary to implement their ALARA responsibilities.

Though not required, the inspectors found during review of Employee Training Profiles for selected design engineers and managers that the *Design Guide for ALARA* was not listed as required reading. However, discussions with the design engineers and observations and

documents demonstrated ALARA was being implemented in the design work. In addition, engineering management took additional steps as described below to augment the design engineers' knowledge and skills in this area.

During the period of June 7 through September 10, 2001, the Technical Baseline Manager led an assessment, titled: "Management Assessment On ALARA Incorporation In Design" (24590-WTP-MAR-ENG-01-007). This assessment made several important observations and recommendations that were documented on the Management Self Assessment Details Form. While target completion dates for these recommendations began on November 30, 2001, significant improvements were noted during this inspection. The Technical Baseline Manager had established and filled a position titled, Radiation Protection Coordinator. The individual started on October 8, 2001, was a nuclear engineer, and had 12 years of experience on the Hanford Reservation. He stated he had been tasked to: (1) support the engineering group in implementation of its radiological protection design features; (2) coordinate support with radiological safety experts; (3) organize design reviews; (4) track and resolve action items; (5) perform cost-benefit analysis to facilitate decision-making regarding enhanced protection features involving ALARA criterion, and (6) improve the application of design guides related to radiological protection. Based on discussion with the Radiation Protection Coordinator and review of the documents he presented, he had accomplished the following: (1) coordinated the presentation of discipline specific training to six design groups; (2) prepared "An Overview of ALARA Requirements for design engineers: HVAC" and one for electrical engineers; (3) coordinated a schedule of design review assignments; (4) scheduled and coordinated a radiation protection design review agenda for Low Activity Waste (LAW) and High Level Waste (HLW) to be held on December 11, 2001; and (5) utilized industry guidance such as DOE-HDBK-1110-97, *ALARA Training for Technical Support Personnel*, and DOE's *Waste Vitrification Systems Lessons Learned*, March 1999, in his effort to improve ALARA in the design process.

In addition, during discussion with a Mechanical Systems Supervisor, the Supervisor presented a nine page detailed checklist designed to utilize the topical guidance from Appendix 2, *Design Guide for ALARA*. This informal checklist gave the design engineer an opportunity to document ALARA actions "considered" in creation of the baseline design. The informal direction to the design engineers was to use the checklist and submit it as an ALARA Design Review (ADR) record (Form 24590-F00100). He also presented the slides from a training session entitled, "ALARA Brief Review, Preparation for DOE OSR Audit, Preparation for ALARA Design Review," that had been presented to members of the Mechanical Systems Group. The training also emphasized the designer's responsibility to consult the Design Criteria Database (DCD) and Standards Identification Process Database (SIPD) to establish the appropriate radiation protection and ALARA criteria.

Several design engineers and radiological safety engineers were observed engaged in design activities. These activities included design work on the LAW Container Finishing Handling (LFH) system, Radioactive Liquid Waste Disposal (RLD) system, Heating Ventilation and Air Conditioning (HVAC) system, and the LAW general arrangement plan. From discussion with these representatives, it was clear that ALARA was an integral part of the design process.

1.3.3 Conclusions

Procedures and guides established and maintained to implement the Contractor's ALARA program were adequate. However, the Contractor's plan to document ALARA actions when the design is finalized may result in lost information and the unnecessary need for rework to recreate the actions taken during preliminary design.

1.4 ALARA Design (ITP I-111)

1.4.1 Inspection Scope

At the time of this inspection, no designs involving ALARA had been finalized. The inspectors reviewed several preliminary system drawings and descriptions, ADR records, and calculations associated with the LAW, High Level Waste (HLW), and Pretreatment (PT) facilities. The inspectors discussed these products with the design and radiological safety engineers to determine if: (1) design features were the primary method used to limit occupational dose, contamination, and the release of airborne radioactive material; (2) optimization methods were used, and; (3) the design objectives limiting dose and controlling airborne radioactive material would be achieved.

1.4.2 Observations and Assessments

Based on review of RPT-W375LV-NS00001, *Classification of Areas Report for LAW*, April 24 2000; RPT-W375LV-NS00003, *Dose Assessment Report for LAW*, April 24, 2000; RPT-W375LV-NS00002, *Shielding Assessment Report for the Low Active Waste Facility*, April 24, 2000; similar documentation associated with HLW and PT; several shielding and dose rate calculations; and dose assessments, it was clear to the inspectors that ALARA considerations were being incorporated into the design. The radiological safety engineers used appropriate validated shielding codes (i.e., MCNP™ and MicroShield™) to evaluate occupational dose rates within the PT, HLW, and LAW facilities. The inspectors noted the radiological safety engineers were proficient in the understanding and application of these codes. Each of the calculations was independently checked within the Radiological Safety Engineering Group.

The inspectors noted that ALARA efforts associated with design of the plant configuration and radiation shielding were focused principally on meeting the target dose rates associated with the various area classifications in accordance with 24590-WTP-GPP-SRAD-007, *Classification of Areas*. Although this effort, in itself, could be considered an ALARA measure because the target dose rates were significantly less than both the design objectives and the applicable dose standards, this did not necessarily represent the use of optimization methods as specified in 10 CFR 835.1002(a). The team found that some examples of optimization methods involving ALARA considerations were being adequately applied to selected design issues. For example, optimization methods applied to the reconfiguration of the PT facility were documented on an ADR record, 24590-PTF-ADR-PL-01-001, "Pretreatment Reconfiguration," dated August 2, 2001. However, as the facility design progresses, documentation will be needed to demonstrate that optimization methods were applied to support significant actions taken to maintain

occupational exposures and control of airborne radioactive material ALARA consistent with the requirements of 10 CFR 835.1002(a). The inspectors identified no optimization methods deficiencies.

The inspectors had discussions with the design engineer and his supervisor regarding the following LAW liquid radioactive waste drain system preliminary design products that the inspectors reviewed:

- ADR record 24590-LAW-ADR-J-01-001 and CCN 024855, "Air/Area Monitoring System;"
- Process Flow Diagram 24590-LAW-M5-V17T-00014, "LAW Liquid Effluent," Rev. 1;
- "Equipment Assembly C3/C5 Drains and Sump Collection Vessel V25002," 24590-WTP-M-RLD-00001, Rev. A;
- "Equipment Assembly C1/C2 Drains/Sump Collection Tank T25032," 24590-WTP-MV-NLD-0001, Rev. A; and
- "P&ID-LAW Radioactive Liquid Waste Disposal System C3/C5 Drains/Sump Collection," 24590-WTP-LAW-MG-RLD-00002, Rev. B.

From the interviews and review of these documents, it was clear to the inspectors that actions were being taken and documented to ensure that contamination and airborne radioactive material had been controlled. The design engineer and his supervisor had completed the informal check-sheet documenting implementation of the *Design Guide for ALARA* and attached it to an ADR record for review and submittal to the records management system.

The inspectors performed an in depth review of design process for LAW HVAC system. The inspectors chose the LAW HVAC system because the design for this particular facility and system was further along than some of the other facilities and systems. From a review of preliminary design documentation associated with the LAW HVAC systems and general High Efficiency Particulate Air (HEPA) filter system documentation, the inspectors found evidence that actions were being taken and documented to ensure that contamination and airborne radioactive material would be controlled. Key documents reviewed by the inspectors included one Revision 0 and 6 preliminary LAW general arrangement drawings, 3 design input memoranda, two ADR records, one design control checklist, one calculation related to door gaps and pressure drops, and 8 records identified as applicable to ALARA.

In addition, the inspectors interviewed HVAC design engineers and radiological safety engineers and confirmed that interactions were occurring between the HVAC Design Engineering and Radiological Safety Engineering Groups. Based on discussions with the radiological safety engineer assigned to LAW and documented meeting minutes, the inspectors determined there were indications that the radiological safety engineers had been involved in several of the decisions regarding ALARA implications of airlocks, HVAC systems, and classification of areas. The Radiological Safety Engineering Group established the classification of areas of a facility based on the expected source term, occupancy factors, anticipated work activities, and

anticipated contamination and airborne radioactivity levels. The Radiological Safety Engineering Group will be involved in the review and approval of final drawings (Revision 0).

As a part of this review, the inspectors reviewed classification of areas, and the establishment of airlocks and HEPA filter systems. From interviews with the HVAC design engineer, the inspectors found indications that action items associated with HVAC system decisions were being addressed, with some of the action closure documentation being informal (e.g., e-mails). Additionally, the inspectors reviewed 20 completed Document Review Requests (DRRs) for the "LAW General Arrangement Drawing, -21 Elevation" drawing and found they provided evidence that required reviews had been completed and HVAC design engineering and radiological safety engineering had performed a review of the drawing. The inspectors noted that the DRR process did not require comments to be retained, only that the conduct of the review be recorded. Because Contractor procedures only require ALARA records to be generated at final design approval, there was no requirement to retain all comments related to preliminary drawings and documents. However, if key ALARA design decisions are made as a result of preliminary design review comments, then the actions taken to maintain occupational exposures ALARA are required to be documented (10 CFR 835.704(b)). The inspectors concluded that key ALARA decisions were not always being documented. As stated in Section 1.3.2, the rationale and justification for these ALARA activities may be difficult to recreate later when the final design is issued.

The inspectors reviewed other ALARA records for HEPA systems for the PT facility. Decisions related to HEPA concept selection for pretreatment reconfiguration were documented as part of meeting minutes (CCN: 020052). Specifically, the Contractor performed a Kepner-Tregoe type of optimization analysis during a "challenge team" meeting. Per the *Application of ALARA in the Design Process* procedure, the Contractor conducted a formal ADR (ADR record 24590-PTF-ADR-01-001). The ADR record briefly described the results from the challenge team meetings, although a connection to some of the pertinent records that document the decisions (e.g., the HEPA concept selection meeting minutes) was lacking. Despite this, the reviewers found design features were the primary method used to limit occupational dose and to control airborne radioactive material.

1.4.3 Conclusions

Although little of the design directly impacting occupational radiation protection had been finalized, there was consistent evidence that ALARA had been considered and actions had been taken to ensure the design objectives for controlling occupational exposure from external sources of radiation and airborne radioactive materials would be achieved. As in Section 1.3, the inspectors identified additional examples of failure to formally document ALARA considerations during preliminary design.

1.5 Consideration of Non-Radiological Hazards (ITP I-111)

1.5.1 Inspection Scope

The inspectors reviewed procedures and processes established to consider and incorporate non-radiological hazards into the ALARA process during design of the facility. This requirement was implemented largely through the integrated safety management process and risk assessment system.

1.5.2 Observations and Assessments

The Contractor's Integrated Safety Management Plan, 24590-WTP-ISMP-ESH-01-001, Rev. 0, Section 6.1.4, described the risk assessment system that was to be used to ensure that all significant risks are identified. It stated, "The RPP-WTP risk assessment system evaluates tasks and the work environment to anticipate, recognize, evaluate, and control situations, conflicts, and stressful situations and other conditions that may significantly affect the health, safety, or efficiency of Project employees."

One way the Contractor identified hazards was during the Integrated Safety Management (ISM) process. For example, the Contractor was going through the Phase I ISM process for reconfiguration of the PT facility. Pertinent standards and criteria from this process were captured in SIPD. The design process then used SIPD as one of many inputs into the design of the facility. Based on interviews with the safety analyst and industrial health and safety staff, the inspectors observed situations where the safety analysts identified non-radiological hazards and solicited input from the industrial health and safety staff for considerations of how to minimize physical, chemical, and industrial hazards. For example, staff from the industrial health and safety organization provided input on Occupational Safety and Health Administration (OSHA) requirements on crane clearances. In another example, the staff identified the concern for compressor noise exceeding the thresholds for the hearing conservation program. Further evidence of the consideration of non-radiological hazards was noted in Section 6 of RPT-W375LV-NS00002, Rev. 0, *Shielding Assessment Report for the Low Activity Waste Facility*. This example involved the replacement of flammable HEPA in-bleed filters with smaller non-HEPA type filters and back flow dampers. However, documentation of these interactions was found to be largely informal (e.g., e-mails).

The Procedure 24590-WTP-GPP-PADC-003, Revision 0, *Internal Review and Approval of Documents*, Section 3.4, required the Environmental, Safety, and Health Organization (ES&H) to review new documents (except drawings) or changed documents identified in the electronic library as affecting the authorization basis. Based on interviews with industrial health and safety and radiological safety engineering staff members, appropriate staff members reviewed critical design documents. The ES&H Organization had established a good system for tracking comments internal to ES&H. The system provided a method for ensuring required reviews had been conducted and mandatory comments resolved as necessary prior to the ES&H Manager final approval. The system also helped ensure that appropriate discipline-specific reviews were conducted, thus facilitating consideration of both radiological and non-radiological hazards in the design process. Interviews with the ES&H staff indicated that between mid-June and November 28, 2001, 877 documents had been received by ES&H. The inspectors identified no deficiencies.

1.5.3 Conclusions

The Contractor had established processes so that design actions included consideration of non-radiological hazards during implementation of the ALARA process. Implementation of these processes should ensure consideration of industrial, physical, and chemical hazards and the risk of personnel injury from non-radiological hazards will not be disproportionately increased as a result of radiological ALARA applications.

1.6 ALARA Records (ITP I-111 and ITP I-151)

1.6.1 Inspection Scope

The inspectors reviewed records established to document actions taken to maintain occupational exposures ALARA as required in 10 CFR 835, Section 704, "Administrative Records." This requirement was implemented through the RPP and *Waste Treatment Plant Radiological Control Manual*. Guidance presented in DOE G 441.1-2, *Occupational ALARA Program Guide*, and DOE G 441.1-11, *Occupational Radiation Protection Recording-Keeping And Reporting Guide*, were also used to assess the adequacy and effectiveness of the record-keeping procedural requirements. Quality assurance surveillances and management assessments were reviewed to determine if the Contractor had routinely assessed implementation of ALARA record-keeping requirements. The scope of this inspection effort focused on LAW activities.

1.6.2 Observations and Assessments

Search of the document control database system using the ALTERIS system resulted in 203 records which had been characterized as "Applicable to ALARA" for the period of March 2001 through November 19, 2001. Within this set, the inspectors identified one informal and three formal ADR records. ADR, 24590-LAW-ADR-J-01-001, focused on the LAW -21 ft. elevation air/area monitoring system and CCN: 024252 meeting minutes documented an ALARA review of the LAW melter equipment support handling system, bubbler import/export activities. Both records met the criteria presented in Section 3.4.5, "ALARA Design Reviews," application of the *Application of ALARA in the Design* procedure.

The inspectors also identified 25 pages of e-mails and short memoranda discussing ALARA related matters. These records were consistent with the requirements of Section 4.2, "ALARA Record Identification," of the *Application of ALARA in the Design* procedure.

The inspectors reviewed the following quality assurance surveillance reports: SV-24590-01-QA-00035, 24590-WTP-SV-QA-01-004, 24590-WTP-SV-QA-01-074, 24590-WTP-SV-QA-01-075, and 24590-WTP-SV-01-153-157. The first report, dated June 6, 2001, identified the Design Review Checklist (Form K13F028) had not been used. The surveillances documented that corrective actions were not necessary because the procedure stated that the checklist "should be used." The next three surveillances, those dated June 26 and September 20, 2001, indicated that review of ALARA design and documentation of actions was satisfactory because the design was in a preliminary phase and the Contractor's process allowed for formal ADR records to be

generated when final design drawings were developed. The final surveillances (24590-WTP-SV-01-153-157) resulted in two Corrective Action Reports (CAR) dated November 21, 2001. The final surveillances noted the following issues: (1) there was no tracking mechanism in place for action items on ADR records; and (2) The *Application of ALARA in Design Process* procedure is unclear regarding when ADR Checklists (Form 24590-F00099) should be retained and as a result, a review of ALTERIS system Project Document Control revealed no ADR Checklists had been generated as individual records.

The Contractor documented on CAR 24590-WTP-CAR-01-014, that since ADR-W375-00-00024, "Review of Pretreatment Building General Arrangements for Optimization Study," and 24590-PTF-ADR-PL-01-001, did not include the ADR Checklist, the *Application of ALARA in Design Process* procedure should be revised to better define when these record forms should be used. Specifically, the procedure contained many "should" statements (i.e., compliance was expected but not required) that could result in inconsistent performance in the documenting of actions taken to maintain ALARA. The recommended actions from the CAR were to (1) Review all ADR records to determine if checklists should have generated and complete checklists as required; and (2) Revise the *Application of ALARA in Design Process* procedure to better define when ADR checklists have to be used for ALARA Design Reviews to prevent not completing them at future key stages in the design process. The Contractor's documented on CAR 24590-WTP-CAR-QA-01-013 that action items recorded on the Document Information Form (Form 24590-F0020) did not provide for action item tracking of those items in the ADR records. The recommended actions from the CAR were to: (1) Revise the *Project Records Management* procedure (24590-WTP-GPP-PADC-002A, Rev. 0) to include a tracking mechanism for action items listed in ADR records; and (2) Review existing ADR records for action items and incorporate into whatever new tracking mechanism is used. The Contractor did not provide documentation of its corrective actions taken in response to the CARs; however, based on the recommended actions described, the inspectors concluded that the actions recommended should be sufficient to address the deficiencies identified in the CARs.

Based on the review of the above listed quality assurance surveillance reports and associated CARs, and discussions with design and radiological safety engineers, the inspectors concluded that not all considerations or actions taken to maintain occupational dose ALARA were being entered into the records management system at this stage of the design process. The engineers indicated that some of the preliminary ALARA criteria and considerations records might not be maintained during an update to preliminary design. When the design is approved, ALARA documentation is required to be complete. Despite lack of specific requirement to document preliminary ALARA design activities, the Contractor's own identification of concerns regarding documentation of preliminary ALARA design activities, and the lack of many ADR records of these activities, the inspectors identified no Findings in this area. Further discussions of this lack of documentation are documented in Sections 1.3 and 1.4 of this report.

The lack of specificity regarding the requirement to document preliminary ALARA design efforts in the *Application of ALARA in Design Process*, and the *Design Guide for ALARA*, and the engineering design process procedures, resulted in inconsistent documentation of actions considered or taken to meet the ALARA criterion.

In response to the inspectors' concerns regarding documentation of ALARA design activities, the Radiological Operations Lead Engineer stated that documentation of the actions taken to maintain occupational exposures ALARA would be documented when the design was finalized with issuance of the Revision "0" drawings. Although the Contractor's plan to document ALARA actions when the design is finalized was acceptable, the inspectors expressed concern that some information may be unnecessarily lost if not documented when the actions were taking place.

1.6.3 Conclusions

As a result of the preliminary stage of the design, the inspectors were able to view only three ADR records. No deficiencies were identified in the records. Documentation of actions considered or taken to implement the ALARA criteria was being generated for preliminary design. However, the inspectors found some of these documents were not necessarily required to be maintained to support the final design (i.e., Revision 0). As described in Section 1.3, this could result in lost information and rework at final design. The Contractor also identified this in its management self-assessments and quality assurance surveillances.

2.0 EXIT MEETING SUMMARY

The inspectors presented the inspection results to members of Contractor management at an exit meeting on November 30, 2001. The Contractor acknowledged the observations and conclusions presented. Subsequent to the exit meeting, the lead inspector asked the Contractor representative whether any materials examined during the inspection should be considered limited rights data. The Contractor stated that no limited rights data was examined during the inspection.

3.0 REPORT BACKGROUND INFORMATION

3.1 Partial List of Persons Contacted

M. Perks, Radiological & Fire Protection Manager
 E. Hughes, Deputy Engineering Manager, Systems and Projects
 G. Kloster, Technical Baseline Manager
 G. Schell, QA Manager
 S. Lynch, Manager of Engineering Technology
 J. Sanders, HVAC Manager
 M. Johnson, LAW Mechanical Handling Supervisor
 S. Vail, Mechanical Systems Engineering Supervisor
 E. Isern, LAW Mechanical Systems Supervisor
 S. Henry, Radiological Operations Lead Engineer
 M. Platt, Safety Program Lead
 J. Khojandi, Radiation Protection Coordinator
 E. Smith, Safety Program Engineer
 B. Niemi, Safety Program Engineer

T. Ketchum, Mechanical Engineer
P. Holgado, Senior Engineer
G. Simiele, Radiological Safety Engineer II
W. Gripenog, Radiological Safety Engineer II
R. Miles, Radiological Safety Engineer II
R. Winslow, Radiological Safety Engineer II
J. Rathbun, Radiological Safety Engineer II
P. Sullivan, Deputy Supervisor LAW HVAC Engineering
J. Strickler, Senior Mechanical Engineer
J. Morse, Senior Safety Engineer
S. Marko, Industrial Hygienist
E. Saucedo, ES&H Secretary
S. Lilley, Safety Analyst
J. Hinckley, Lead Safety Analyst, LAW
W. Underwood, LAW Control and Instrument Supervisor
A. Harshfield, Supervising/Sub-Lead Designer, LAW Plant Design
L. Dougherty, Safety and Licensing Engineer, PSAR Lead
P. Latham, Mechanical Lead Engineer

3.2 List of Inspection Procedures Used

Inspection Technical Procedure I-111, *ALARA Program Assessment*
Inspection Technical Procedure I-151, *RCP Documents, Records, and Report Assessment*

3.3 List of Items Opened, Closed, and Discussed

3.3.1 Opened

None

3.3.2 Closed

None

3.3.3 Discussed

None

3.4 Documents Reviewed but not Identified in the Report

- ALARA Design Review Record, ADR-W375-00-0003, "LAW Radiation and Contamination Zones," January 13, 2000
- Calculation Sheet, 24590-LAW-ADC-C5V-00001, Revision A, "LAW HVAC Door Gap/Pressure Drop Calculation"
- 20 completed Document Review Request sheets (Form K70F507), Revision 7, February 6, 2001
- Data from the Design Criteria Database using the keyword "ALARA"
- Design Input Memorandum, 24590-LAW-M81-C2V-00002, Revision A, "LAW Vitrification Building Volumetric V&ID C2 Air Distribution Elevation 48 feet and 68 feet"
- Design Input Memorandum, 24590-LAW-M8-C5V-0002, Revision A, "LAW Vitrification Building"
- Design Input Memorandum, 24590-LAW-P1-P01T-00001, Revision 0, "LAW Vitrification Building – Plan at Elevation –21 feet," September 17, 2001
- Document, RPT-W375LV-NS00001, Revision 1, "Classification of Areas Report for LAW"
- Design Control Checklist, 24590-WTP-DCCL-HV-01-001, Revision 0, "HVAC/Fire Protection"
- External Letter, CCN: 022173, "Contract No. DE-AC27-01RV14136 – Filtration of C2 Ventilation Exhaust," August 16, 2001
- "LAW General Arrangement Drawing, -21 Feet Elevation," Revision 0, 24590-LAW-P1-P01T-00001
- Meeting Minutes, CCN: 019690, "Define HVAC and Fire Protection Requirements for LAW 311-314 Shield Doors and Hatches," April 17, 2001
- Meeting Minutes, CCN: 022071, "C2 Filtration (HEPAs) and Path Forward," August 6, 2001
- Meeting Minutes, CCN: 022323, "C2 Airlock Trend Development," August 14, 2001
- Meeting Minutes, CCN: 020052, "HEPA Concept Selection," April 3, 2001

- "Preliminary LAW General Arrangement Drawing, -21 Feet Elevation," DWG-W375LV-PL00042, Revision C, April 28, 2000
- "Preliminary LAW General Arrangement Drawing, -3 Feet Elevation," DWG-W375LV-PL00043, Revision A
- "Preliminary LAW General Arrangement Drawing, 22 Feet Elevation," DWG-W375LV-PL00044, Revision A
- "Preliminary LAW General Arrangement Drawing, 28 Feet Elevation," DWG-W375LV-PL00045, Revision A
- "Preliminary LAW General Arrangement Drawing, 48 Feet Elevation," DWG-W375LV-PL00046, Revision A
- "Preliminary LAW General Arrangement Drawing, 68 Feet Elevation," DWG-W375LV-PL00047, Revision A
- RPP-WTP Memorandum, CCN: 021126, "LAW HVAC Air Monitoring Systems," June 28, 2001
- RPP-WTP Memorandum, CCN: 022696, "LAW C2 Airlock Trend Action Items," September 6, 2001
- Trend Notice (Form K60F005), Rev. 1, June 27, 2001, TN-24590-01-00112, "C-2 HEPA Filtration," August 22, 2001.

3.5 List of Acronyms

ALARA	as low as reasonably achievable
ADR	ALARA Design Review
ASC	ALARA Sub-Committee
BNI	Bechtel National, Inc.
DCD	Design Criteria Database
DIM	Design Input Memorandum
DOE	U. S. Department of Energy
DMS	Document Management System
DRR	Document Review Request
ES&H	Environmental Safety and Health
HEPA	High Efficiency Particulate Air
HLW	High Level Waste
HVAC	Heating Ventilation and Air Conditioning
IFI	Inspection Follow-up Item
IR	Inspection Report
ISM	Integrated Safety Management

ISMP	Integrated Safety Management Plan
ITP	Inspection Technical Procedure
ITS	important-to-safety
LAW	Low Activity Waste
LFH	LAW Container Finishing Handling
NRC	Nuclear Regulatory Commission
ORP	Office of River Protection
OSR	Office of Safety Regulation
PDC	Project Document Control
PSC	Project Safety Committee
PT	Pretreatment
QA	Quality Assurance
QAM	Quality Assurance Manual
QAP	Quality Assurance Program
RLD	Radioactive Liquid Waste Disposal
RPP	Radiation Protection Program
RPP-WTP	River Protection Project Waste Treatment Plant
SIPD	Standards Identification Process Database
SRD	Safety Requirements Document
SSCs	structures, systems, and components
WTP	Waste Treatment Plant
WTPRCM	Waste Treatment Plant Radiological Controls Manual

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